# Analytical Laboratory

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# Order Summary Report

**Order Number:** **J12110110**

Project Name: Flex Fuel WW

Customer Name(s): Bill Kennedy, Melonie Martin, Wayne Chapman, Tom Johnson

Customer Address: 3195 Pine Hall Rd
Mailcode: Belews Steam Station
Belews Creek, NC 28012

Lab Contact: Jason C Perkins Phone: 980-875-5348

**Report Authorized By: (Signature)** Digitally signed by jay perkins DN: cn=jay perkins, o=Analytical Lab, ou, email=jay.perkins@duke-energy.com, c=US Date: 2012.11.28 13:43:46 -05'00' **Date:** 11/28/2012

## Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

### Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

### Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

*Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)*

### Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

## Sample ID's & Descriptions:



| Sample ID | Plant/Station | Collection Date and Time | Collected By | Sample Description |
|---|---|---|---|---|
| 2012023769 | BELEWS | 05-Nov-12 9:40 AM | TRAVIS THORNTON | FGD Purge Eff |
| 2012023770 | BELEWS | 05-Nov-12 8:35 AM | TRAVIS THORNTON | EQ TANK |
| 2012023771 | BELEWS | 05-Nov-12 8:40 AM | TRAVIS THORNTON | BIOREACTOR 1 INF |
| 2012023772 | BELEWS | 05-Nov-12 8:40 AM | TRAVIS THORNTON | biOREACTOR 1 INF HG BLK |
| 2012023773 | BELEWS | 05-Nov-12 8:45 AM | TRAVIS THORNTON | BIOREACTOR 2 INF. |
| 2012023774 | BELEWS | 05-Nov-12 8:45 AM | TRAVIS THORNTON | BIOREACTOR 2 INF. HG BLANK |
| 2012023775 | BELEWS | 05-Nov-12 8:50 AM | TRAVIS THORNTON | BIOREACTOR 2 EFF. |
| 2012023776 | BELEWS | 05-Nov-12 8:50 AM | TRAVIS THORNTON | BIOREACTOR 2 EFF. HG BLANK |
| 2012023777 | BELEWS | 05-Nov-12 9:15 AM | TRAVIS THORNTON | FILTER BLANK |

9 Total Samples

# Technical Validation Review

## Checklist:

| | | |
|---|---|---|
| COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures). | ☑ Yes | ☐ No |
| All Results are less than the laboratory reporting limits. | ☐ Yes | ☑ No |
| All laboratory QA/QC requirements are acceptable. | ☑ Yes | ☐ No |

## Report Sections Included:

- ☑ Job Summary Report
- ☑ Sample Identification
- ☑ Technical Validation of Data Package
- ☑ Analytical Laboratory Certificate of Analysis
- ☐ Analytical Laboratory QC Report
- ☑ Sub-contracted Laboratory Results
- ☐ Customer Specific Data Sheets, Reports, & Documentation
- ☐ Customer Database Entries
- ☑ Chain of Custody
- ☑ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DBA Account Date: 11/28/2012

# Certificate of Laboratory Analysis



**Order # J12110110**

Site: FGD Purge Eff
Collection Date: 05-Nov-12 9:40 AM

**Sample #: 2012023769**
Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **INORGANIC IONS BY IC** | | | | | | | | |
| Bromide | **78** | mg/L | | 5 | 50 | EPA 300.0 | 11/12/2012 20:08 | JAHERMA |
| Chloride | **5400** | mg/L | | 100 | 1000 | EPA 300.0 | 11/12/2012 20:08 | JAHERMA |
| Sulfate | **1200** | mg/L | | 100 | 1000 | EPA 300.0 | 11/12/2012 20:08 | JAHERMA |
| **MERCURY (COLD VAPOR) IN WATER** | | | | | | | | |
| Mercury (Hg) | **168** | ug/L | | 5 | 100 | EPA 245.1 | 11/08/2012 14:54 | AGIBBS |
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **5.45** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/07/2012 10:40 | MHH7131 |
| **TOTAL RECOVERABLE METALS BY ICP** | | | | | | | | |
| Boron (B) | **144** | mg/L | | 0.5 | 10 | EPA 200.7 | 11/14/2012 13:00 | DJSULL1 |
| Calcium (Ca) | **3540** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:00 | DJSULL1 |
| Iron (Fe) | **131** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:00 | DJSULL1 |
| Magnesium (Mg) | **691** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:00 | DJSULL1 |
| Manganese (Mn) | **6.34** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:00 | DJSULL1 |
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **163** | ug/L | | 10 | 10 | EPA 200.8 | 11/14/2012 15:20 | KRICHAR |
| **TOTAL RECOVERABLE METALS BY ICP-MS** | | | | | | | | |
| Arsenic (As) | **196** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Cadmium (Cd) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Chromium (Cr) | **213** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Copper (Cu) | **128** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Nickel (Ni) | **167** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Selenium (Se) | **4290** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Silver (Ag) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| Zinc (Zn) | **307** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:37 | KRICHAR |
| **SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_AS&C |
| **TOTAL DISSOLVED SOLIDS** | | | | | | | | |
| TDS | **15000** | mg/L | | 200 | 1 | SM2540C | 11/14/2012 16:23 | SWILLI3 |
| **TOTAL SUSPENDED SOLIDS** | | | | | | | | |
| TSS | **3100** | mg/L | | 250 | 1 | SM2540D | 11/06/2012 13:34 | SWILLI3 |

# Certificate of Laboratory Analysis

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**Order # J12110110**

Site: EQ TANK
Collection Date: 05-Nov-12 8:35 AM

**Sample #:** **2012023770**
Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY (COLD VAPOR) IN WATER** | | | | | | | | |
| Mercury (Hg) | **80.8** | ug/L | | 2.5 | 50 | EPA 245.1 | 11/08/2012 14:57 | AGIBBS |
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **4.60** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/07/2012 10:44 | MHH7131 |
| **TOTAL RECOVERABLE METALS BY ICP** | | | | | | | | |
| Boron (B) | **141** | mg/L | | 0.5 | 10 | EPA 200.7 | 11/14/2012 13:04 | DJSULL1 |
| Calcium (Ca) | **3150** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:04 | DJSULL1 |
| Iron (Fe) | **71.8** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:04 | DJSULL1 |
| Magnesium (Mg) | **608** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:04 | DJSULL1 |
| Manganese (Mn) | **5.26** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:04 | DJSULL1 |
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **115** | ug/L | | 10 | 10 | EPA 200.8 | 11/14/2012 15:23 | KRICHAR |
| **TOTAL RECOVERABLE METALS BY ICP-MS** | | | | | | | | |
| Arsenic (As) | **122** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Cadmium (Cd) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Chromium (Cr) | **140** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Copper (Cu) | **85.3** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Nickel (Ni) | **135** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Selenium (Se) | **2530** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Silver (Ag) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |
| Zinc (Zn) | **213** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:41 | KRICHAR |

Site: BIOREACTOR 1 INF
Collection Date: 05-Nov-12 8:40 AM

**Sample #:** **2012023771**
Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **0.380** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/07/2012 10:48 | MHH7131 |
| **TOTAL RECOVERABLE METALS BY ICP** | | | | | | | | |
| Boron (B) | **139** | mg/L | | 0.5 | 10 | EPA 200.7 | 11/14/2012 13:08 | DJSULL1 |
| Calcium (Ca) | **2940** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:08 | DJSULL1 |
| Iron (Fe) | **< 0.1** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:08 | DJSULL1 |
| Magnesium (Mg) | **547** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:08 | DJSULL1 |
| Manganese (Mn) | **0.385** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:08 | DJSULL1 |

# Certificate of Laboratory Analysis

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**Order # J12110110**

Site: BIOREACTOR 1 INF **Sample #: 2012023771**

Collection Date: 05-Nov-12 8:40 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **97.0** | ug/L | | 10 | 10 | EPA 200.8 | 11/14/2012 15:27 | KRICHAR |
| **TOTAL RECOVERABLE METALS BY ICP-MS** | | | | | | | | |
| Arsenic (As) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Cadmium (Cd) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Chromium (Cr) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Copper (Cu) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Nickel (Ni) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Selenium (Se) | **105** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Silver (Ag) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| Zinc (Zn) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:44 | KRICHAR |
| **SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_AS&C |

Site: biOREACTOR 1 INF HG BLK **Sample #: 2012023772**

Collection Date: 05-Nov-12 8:40 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |

Site: BIOREACTOR 2 INF. **Sample #: 2012023773**

Collection Date: 05-Nov-12 8:45 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **0.880** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/07/2012 10:52 | MHH7131 |
| **TOTAL RECOVERABLE METALS BY ICP** | | | | | | | | |
| Boron (B) | **140** | mg/L | | 0.5 | 10 | EPA 200.7 | 11/14/2012 13:12 | DJSULL1 |
| Calcium (Ca) | **2990** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:12 | DJSULL1 |
| Iron (Fe) | **< 0.1** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:12 | DJSULL1 |
| Magnesium (Mg) | **531** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:12 | DJSULL1 |
| Manganese (Mn) | **0.881** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:12 | DJSULL1 |

# Certificate of Laboratory Analysis

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**Order # J12110110**

Site: BIOREACTOR 2 INF. **Sample #: 2012023773**

Collection Date: 05-Nov-12 8:45 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **18.1** | ug/L | | 10 | 10 | EPA 200.8 | 11/14/2012 15:30 | KRICHAR |
| **TOTAL RECOVERABLE METALS BY ICP-MS** | | | | | | | | |
| Arsenic (As) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Cadmium (Cd) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Chromium (Cr) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Copper (Cu) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Nickel (Ni) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Selenium (Se) | **13.7** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Silver (Ag) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| Zinc (Zn) | **< 10** | ug/L | | 10 | 10 | EPA 200.8 | 11/15/2012 11:47 | KRICHAR |
| **SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_AS&C |

Site: BIOREACTOR 2 INF. HG BLANK **Sample #: 2012023774**

Collection Date: 05-Nov-12 8:45 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |

Site: BIOREACTOR 2 EFF. **Sample #: 2012023775**

Collection Date: 05-Nov-12 8:50 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **INORGANIC IONS BY IC** | | | | | | | | |
| Bromide | **81** | mg/L | | 5 | 50 | EPA 300.0 | 11/12/2012 20:27 | JAHERMA |
| Chloride | **5900** | mg/L | | 100 | 1000 | EPA 300.0 | 11/12/2012 20:27 | JAHERMA |
| Sulfate | **1300** | mg/L | | 100 | 1000 | EPA 300.0 | 11/12/2012 20:27 | JAHERMA |
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **1.18** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/07/2012 10:56 | MHH7131 |

# Certificate of Laboratory Analysis



**Order # J12110110**

Site: BIOREACTOR 2 EFF. **Sample #: 2012023775**

Collection Date: 05-Nov-12 8:50 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **TOTAL RECOVERABLE METALS BY ICP** | | | | | | | | |
| Boron (B) | **139** | mg/L | | 0.5 | 10 | EPA 200.7 | 11/14/2012 13:16 | DJSULL1 |
| Calcium (Ca) | **3050** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:16 | DJSULL1 |
| Iron (Fe) | **< 0.1** | mg/L | | 0.1 | 10 | EPA 200.7 | 11/14/2012 13:16 | DJSULL1 |
| Magnesium (Mg) | **526** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:16 | DJSULL1 |
| Manganese (Mn) | **1.19** | mg/L | | 0.05 | 10 | EPA 200.7 | 11/14/2012 13:16 | DJSULL1 |
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **6.80** | ug/L | | 5 | 5 | EPA 200.8 | 11/14/2012 15:33 | KRICHAR |
| **TOTAL RECOVERABLE METALS BY ICP-MS** | | | | | | | | |
| Arsenic (As) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Cadmium (Cd) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Chromium (Cr) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Copper (Cu) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Nickel (Ni) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Selenium (Se) | **7.78** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Silver (Ag) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| Zinc (Zn) | **< 5** | ug/L | | 5 | 5 | EPA 200.8 | 11/15/2012 11:51 | KRICHAR |
| **SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_AS&C |

Site: BIOREACTOR 2 EFF. HG BLANK **Sample #: 2012023776**

Collection Date: 05-Nov-12 8:50 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **MERCURY 1631 - (Analysis Performed by Brooks Rand Labs LLC)** | | | | | | | | |
| Vendor Parameter | **Complete** | | | | | Vendor Method | | V_BRAND |

Site: FILTER BLANK **Sample #: 2012023777**

Collection Date: 05-Nov-12 9:15 AM Matrix: OTHER

| Analyte | Result | Units | Qualifiers | RDL | DF | Method | Analysis Date/Time | Analyst |
|---|---|---|---|---|---|---|---|---|
| **DISSOLVED METALS BY ICP** | | | | | | | | |
| Manganese (Mn) | **< 0.005** | mg/L | | 0.005 | 1 | EPA 200.7 | 11/07/2012 10:17 | MHH7131 |
| **DISSOLVED METALS BY ICP-MS** | | | | | | | | |
| Selenium (Se) | **< 1** | ug/L | | 1 | 1 | EPA 200.8 | 11/14/2012 14:20 | KRICHAR |

APPLIED SPECIATION
AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

November 20, 2012

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: Belews Creek (Flex Fuel) - WW (LIMS # J12110110)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation. The samples were received in a sealed cooler at 6.0°C on November 12, 2012. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: Belews Creek (Flex Fuel) - WW (LIMS # J12110110)

November 20, 2012

## 1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis. The samples were received on November 12, 2012 in a sealed container at 6.0°C.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and were designated discrete sample identifiers. An aliquot of each sample was filtered (0.45µm) and each filtrate was stored in a secure, monitored cryofreezer (maintained at a temperature of -80$^{o}$C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS).

## 2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

*Selenium Speciation Analysis by IC-ICP-DRC-MS* Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into an autosampler vial. No further sample preparation was performed as any chemical alteration of a sample may shift the equilibrium of the system, resulting in changes in speciation ratios.

## 3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of

each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

*Selenium Speciation Analysis by IC-ICP-DRC-MS* Each sample for selenium speciation analysis was analyzed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS) on November 13, 2012. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic (pH > 7) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a reaction gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

## 4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with the samples were within acceptance limits.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110110

Date: November 20, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

***Sample Results***

| Sample ID | Se(IV) | Se(VI) | SeCN | MeSe(IV) | SeMe | Unknown Se Species (n) |
|---|---|---|---|---|---|---|
| FGD Purge Eff | 61.8 | 64.6 | ND (<3.2) | ND (<2.5) | ND (<2.5) | 0.0 (0) |
| BioReactor 1 Inf | 19.3 | 58.8 | ND (<0.80) | 2.12 | ND (<0.63) | 0.70 (1) |
| BioReactor 2 Inf | 1.22 | ND (<0.34) | ND (<0.80) | ND (<0.63) | ND (<0.63) | 0.0 (0) |
| BioReactor 2 Eff | ND (<0.73) | ND (<0.34) | ND (<0.80) | ND (<0.63) | ND (<0.63) | 0.0 (0) |

All results reflect the applied dilution and are reported in µg/L
ND = Not detected at the applied dilution
SeCN = Selenocyanate
MeSe(IV) = Methylseleninic acid
SeMe = Selenomethionine
Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110110

Date: November 20, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

***Quality Control Summary - Preparation Blank Summary***

| Analyte (µg/L) | PBW1 | PBW2 | PBW3 | PBW4 | Mean | StdDev | eMDL* | eMDL 50x | eMDL 200x |
|---|---|---|---|---|---|---|---|---|---|
| Se(IV) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.015 | 0.73 | 2.9 |
| Se(VI) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.34 | 1.4 |
| SeCN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.016 | 0.80 | 3.2 |
| MeSe(IV) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.013 | 0.63 | 2.5 |
| SeMe | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.013 | 0.63 | 2.5 |

eMDL = Estimated Method Detection Limit
*Please see narrative regarding eMDL calculations

***Quality Control Summary - Certified Reference Materials***

| Analyte (µg/L) | CRM | True Value | Result | Recovery |
|---|---|---|---|---|
| Se(IV) | LCS | 9.57 | 9.61 | 100.4 |
| Se(VI) | LCS | 9.48 | 9.27 | 97.7 |
| SeCN | LCS | 8.92 | 9.04 | 101.4 |
| MeSe(IV) | LCS | 6.47 | 6.66 | 103.0 |
| SeMe | LCS | 9.32 | 8.85 | 94.9 |

Selenium Speciation Results for Duke Energy
Project Name: Belews Creek (Flex Fuel) - WW
Contact: Jay Perkins
LIMS #J12110110

Date: November 20, 2012
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

***Quality Control Summary - Matrix Duplicates***

| Analyte (µg/L) | Sample ID | Rep 1 | Rep 2 | Mean | RPD |
|---|---|---|---|---|---|
| Se(IV) | Batch QC | 111.7 | 110.1 | 110.9 | 1.4 |
| Se(VI) | Batch QC | 69.7 | 63.0 | 66.4 | 10.0 |
| SeCN | Batch QC | ND (<3.2) | ND (<3.2) | NC | NC |
| MeSe(IV) | Batch QC | 3.0 | 2.7 | 2.8 | 9.9 |
| SeMe | Batch QC | ND (<2.5) | ND (<2.5) | NC | NC |

ND = Not detected at the applied dilution
NC = Value was not calculated due to one or more concentrations below the eMDL

***Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate***

| Analyte (µg/L) | Sample ID | Spike Conc | MS Result | Recovery | Spike Conc | MSD Result | Recovery | RPD |
|---|---|---|---|---|---|---|---|---|
| Se(IV) | Batch QC | 1112 | 1340 | 110.5 | 1112 | 1313 | 108.1 | 2.0 |
| Se(VI) | Batch QC | 1009 | 1087 | 101.2 | 1009 | 1064 | 98.9 | 2.1 |
| SeCN | Batch QC | 915.0 | 838.8 | 91.7 | 915.0 | 830.8 | 90.8 | 1.0 |

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

[19]Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

**Analytical Laboratory Use Only**

LIMS # J1211011 0 | Matrix: OTHER | Samples Originating From | NC ___ SC ___
Logged By cpb | Date & Time 11-6-12 1008 | SAMPLE PROGRAM Ground Water NPDES ___ Drinking Water ___ UST ___ RCRA ___ Waste ___
Vendor | Cooler Temp (C) 4.9
Vendor: ASC, Brooks Rand | [15]Preserv.: 1=HCl 2=$H_2SO_4$ 3=$HNO_3$ 4=Ice 5=None

| | |
|---|---|
| 1)Project Name | Belews Creek (Flex Fuel) - WW |
| 2) Client: | Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy |
| 5)Project: | MBCFFLX01 |
| 6)Account: | |
| Mail Code: | |
| 8)Oper. Unit: | BC01 |
| 9)Process: | NEXHSTK |
| 10)Activity ID: | |
| 2)Phone No: | |
| 4)Fax No: | |

MR #

*Customer to complete all appropriate non-shaded areas.*

| LAB USE ONLY [11]Lab ID | Se Speciation Bottle ID | [13]Sample Description or ID | Date | Time | Signature | [17]Comp. | [18]Grab | [16]Analyses Required: TDS, TSS | Hg 1631 total and filtered V_Brand | Metals + Hg 245.1* | Mn (ICP), Se (IMS) filtered | Se, Speciation, V_ASC | Chloride, Sulfate, Bromide, - Dionex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 4 | | | 4 | 3 | 3 | 4 | 4 |
| 2022367 | | FGD Purge Eff | 11/5 | 09:40 | Travis Thornton | 9 | | 1 | | 1 | 1 | 1 | 1 |
| 70 | | EQ Tank | 11/5 | 08:35 | Travis Thornton | 5 | | | | 1 | 1 | | |
| 71 | | BioReactor 1 Inf | 11/5 | 08:40 | Travis Thornton | 6 | | | 1 | 1* | 1 | 1 | |
| 72 | | BioReactor 1 Inf Hg Blk | 11/5 | 08:40 | Travis Thornton | 1 | | | 1 | | | | |
| 73 | | BioReactor 2 Inf | 11/5 | 08:45 | Travis Thornton | 6 | | | 1 | 1* | 1 | 1 | |
| 74 | | BioReactor 2 Inf Hg Blk | 11/5 | 08:45 | Travis Thornton | 1 | | | 1 | | | | |
| 75 | | BioReactor 2 Eff | 11/5 | 08:50 | Travis Thornton | 10 | | | 1 | 1* | 1 | 1 | 1 |
| 76 | | BioReactor 2 Eff Hg Blk | 11/5 | 08:50 | Travis Thornton | 1 | | | 1 | | | | |
| 77 | | Filter Blank | 11/5 | 09:15 | Travis Thornton | 2 | | | | | 1 | | |
| | | | | | | | | 2 | 6 | 5 | 6 | 4 | 2 |

Filter Mn and Se in the field

Lab, return kit to Wayne Chapman cpb 11-6

Customer to sign & date below - fill out from left to right.

| | Date/Time | | Date/Time |
|---|---|---|---|
| 1) Relinquished By: Travis Thornton | 11/5/12 0915 | 2) Accepted By: | 11/6/12 0915 |
| 3) Relinquished By: | | 4) Accepted By: Nancy Cullinan | 11/12/12 8:45 Temp 6.8°C |
| 5)Relinquished By: | | 6)Accepted By: | |
| 7)Relinquished By: cpb | 11-8-12 | 8)Accepted By: | |
| 9)Seal/Locked By: cpb | 11-8-12 | 10) Seal/Lock Opened By | |
| 11)Seal/Locked By | | 12)Seal/Lock Opened By | |

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround
21 Days ___X___
*7 Days ___
·48 Hr ___
11-21-12
*Vendor Lab 13 Days ___X___

AB
11

November 27, 2012

Duke Energy
ATTN: Jay Perkins
Scientific Support-Laboratory
13339 Hagers Ferry Road
Huntersville NC 28078
jcperkins@duke-energy.com
labcustomer@duke-energy.com

RE: Project DUK-HV1201 Client Project: J12110110

Dear Mr. Perkins,

On November 10, 2012, Brooks Rand Labs (BRL) received three (3) wastewater samples and three (3) corresponding field blanks. An aliquot was removed from each sample bottle and filtered into a separate container designed for dissolved mercury (Hg) analysis. The sample volume from the original container was logged-in for total Hg analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

Data used for regulatory purposes has a 24 hour filtration holding time requirement. Non-regulatory purposed data has a 48 hour filtration holding time. The samples were received outside of the non-regulatory requirement holding time and were qualified **H**.

The results were blank-corrected as described in the calculations section of the relevant SOP and may have been evaluated using reporting limits that have been adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The recoveries of matrix spike/matrix spike duplicate set MS3/MSD3, performed on another client's sample, were less than the lower limit of the acceptance criteria range. This sample and the associated MS/MSD were re-analyzed at various dilutions without improvement of recovery. The sample 1245023-01 was qualified accordingly. All other quality control samples recovered well including an MS/MSD set from this work order. Aside from concentration qualifiers, all data was reported without further qualification

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report. Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Tiffany Stilwater
Project Manager
tiffany@brooksrand.com

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Report Information

## Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

## Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

## Common Abbreviations

| | | | |
|---|---|---|---|
| **BLK** | method blank | **MS** | matrix spike |
| **BRL** | Brooks Rand Labs | **MSD** | matrix spike duplicate |
| **BS** | laboratory fortified blank | **ND** | non-detect |
| **CAL** | calibration standard | **NR** | non-reportable |
| **CCV** | continuing calibration verification | **PS** | post preparation spike |
| **COC** | chain of custody record | **REC** | percent recovery |
| **CRM** | certified reference material | **RPD** | relative percent difference |
| **D** | dissolved fraction | **RSD** | relative standard deviation |
| **DUP** | duplicate | **SCV** | secondary calibration verification |
| **ICV** | initial calibration verification | **SOP** | standard operating procedure |
| **MDL** | method detection limit | **SRM** | standard reference material |
| **MRL** | method reporting limit | **T** | total recoverable fraction |

## Definition of Data Qualifiers

(Effective 9/23/09)

**B** Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
**E** An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
**H** Holding time and/or preservation requirements not met. Result is estimated.
**J** Estimated value. A full explanation is presented in the narrative.
**J-M** Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
**J-N** Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
**M** Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
**N** Spike recovery was not within acceptance criteria. Result is estimated.
**R** Rejected, unusable value. A full explanation is presented in the narrative.
**U** Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
**X** Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BRL.

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Sample Information

| Sample | Lab ID | Report Matrix | Type | Sampled | Received |
|---|---|---|---|---|---|
| *BioReactor 1 Inf* | 1245045-01 | Influent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 1 Inf* | 1245045-02 | Influent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 1 Inf Hg Blk* | 1245045-03 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |
| *BioReactor 1 Inf Hg Blk* | 1245045-04 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Inf* | 1245045-05 | Influent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Inf* | 1245045-06 | Influent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Inf Hg Blk* | 1245045-07 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Inf Hg Blk* | 1245045-08 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Eff* | 1245045-09 | Effluent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Eff* | 1245045-10 | Effluent | Sample | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Eff Hg Blk* | 1245045-11 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |
| *BioReactor 2 Eff Hg Blk* | 1245045-12 | DIW | Field Blank | 11/05/2012 | 11/10/2012 |

# Batch Summary

| Analyte | Lab Matrix | Method | Prepared | Analyzed | Batch | Sequence |
|---|---|---|---|---|---|---|
| Hg | Water | EPA 1631 | 11/14/2012 | 11/16/2012 | B122122 | 1200873 |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Sample Results

| Sample | Analyte | Report Matrix | Basis | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***BioReactor 1 Inf*** | | | | | | | | | | |
| 1245045-01 | Hg | Influent | T | 80.1 | | 3.79 | 10.1 | ng/L | B122122 | 1200873 |
| 1245045-02 | Hg | Influent | D | 32.6 | H | 0.38 | 1.01 | ng/L | B122122 | 1200873 |
| ***BioReactor 1 Inf Hg Blk*** | | | | | | | | | | |
| 1245045-03 | Hg | DIW | T | 0.15 | U | 0.15 | 0.39 | ng/L | B122122 | 1200873 |
| 1245045-04 | Hg | DIW | D | 0.15 | H, U | 0.15 | 0.39 | ng/L | B122122 | 1200873 |
| ***BioReactor 2 Eff*** | | | | | | | | | | |
| 1245045-09 | Hg | Effluent | T | 3.94 | | 0.15 | 0.40 | ng/L | B122122 | 1200873 |
| 1245045-10 | Hg | Effluent | D | 0.99 | H | 0.15 | 0.41 | ng/L | B122122 | 1200873 |
| ***BioReactor 2 Eff Hg Blk*** | | | | | | | | | | |
| 1245045-11 | Hg | DIW | T | 0.15 | U | 0.15 | 0.40 | ng/L | B122122 | 1200873 |
| 1245045-12 | Hg | DIW | D | 0.15 | H, U | 0.15 | 0.39 | ng/L | B122122 | 1200873 |
| ***BioReactor 2 Inf*** | | | | | | | | | | |
| 1245045-05 | Hg | Influent | T | 53.4 | | 0.38 | 1.01 | ng/L | B122122 | 1200873 |
| 1245045-06 | Hg | Influent | D | 3.15 | H | 0.16 | 0.42 | ng/L | B122122 | 1200873 |
| ***BioReactor 2 Inf Hg Blk*** | | | | | | | | | | |
| 1245045-07 | Hg | DIW | T | 0.15 | U | 0.15 | 0.41 | ng/L | B122122 | 1200873 |
| 1245045-08 | Hg | DIW | D | 0.15 | H, U | 0.15 | 0.40 | ng/L | B122122 | 1200873 |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Accuracy & Precision Summary

**Batch:** B122122
**Lab Matrix:** Water
**Method:** EPA 1631

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---|---|---|---|---|---|---|---|
| **B122122-SRM1** | **Certified Reference Material (1245026, NIST 1641d 1000x dilution)** | | | | | | |
| | Hg | | 15.68 | 15.17 | ng/L | 97% 85-115 | |
| **B122122-MS3** | **Matrix Spike (1245023-01)** | | | | | | |
| | Hg | ND | 105.3 | 45.19 | ng/L | *43%* 71-125 | |
| **B122122-MSD3** | **Matrix Spike Duplicate (1245023-01)** | | | | | | |
| | Hg | ND | 105.3 | 42.88 | ng/L | *41%* 71-125 | 5% 24 |
| **B122122-MS2** | **Matrix Spike (1245045-01)** | | | | | | |
| | Hg | 80.09 | 505.1 | 604.6 | ng/L | 104% 71-125 | |
| **B122122-MSD2** | **Matrix Spike Duplicate (1245045-01)** | | | | | | |
| | Hg | 80.09 | 505.1 | 605.8 | ng/L | 104% 71-125 | 0.2% 24 |
| **B122122-MS5** | **Matrix Spike (1246004-01)** | | | | | | |
| | Hg | 34.07 | 204.1 | 189.3 | ng/L | 76% 71-125 | |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Method Blanks & Reporting Limits

**Batch:** B122122
**Matrix:** Water
**Method:** EPA 1631
**Analyte:** Hg

| Sample | Result | Units |
|---|---|---|
| B122122-BLK1 | 0.14 | ng/L |
| B122122-BLK2 | 0.13 | ng/L |
| B122122-BLK3 | 0.14 | ng/L |
| B122122-BLK4 | 0.14 | ng/L |

**Average:** 0.14 **Standard Deviation:** 0.01 **MDL:** 0.16
**Limit:** 0.50 **Limit:** 0.10 **MRL:** 0.41

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Instrument Calibration

**Sequence:** 1200873
**Instrument:** THG-05
**Date:** 11/16/2012
**Analyte:** Hg

**Total Mercury and Mercury Speciation by CVAFS**
**Method:** EPA 1631

| Lab ID | True Value | Result | Units | REC & Limits | |
|---|---|---|---|---|---|
| 1200873-IBL1 | | 1.31 | pg of Hg | | |
| 1200873-IBL2 | | 2.98 | pg of Hg | | |
| 1200873-IBL3 | | 3.33 | pg of Hg | | |
| 1200873-IBL4 | | 3.85 | pg of Hg | | |
| 1200873-CAL1 | 10.00 | 10.67 | pg of Hg | 107% | |
| 1200873-CAL2 | 25.00 | 25.36 | pg of Hg | 101% | |
| 1200873-CAL3 | 100.0 | 98.13 | pg of Hg | 98% | |
| 1200873-CAL4 | 500.0 | 497.1 | pg of Hg | 99% | |
| 1200873-CAL5 | 2500 | 2443 | pg of Hg | 98% | |
| 1200873-CAL6 | 10000 | 9721 | pg of Hg | 97% | |
| 1200873-ICV1 | 1568 | 1517 | pg of Hg | 97% | 85-115 |
| 1200873-CCB1 | | 8.35 | pg of Hg | | |
| 1200873-CCV1 | 500.0 | 510.3 | pg of Hg | 102% | 77-123 |
| 1200873-CCB2 | | 5.55 | pg of Hg | | |
| 1200873-CCB3 | | 4.97 | pg of Hg | | |
| 1200873-CCB4 | | 4.53 | pg of Hg | | |
| 1200873-CCV2 | 500.0 | 505.9 | pg of Hg | 101% | 77-123 |
| 1200873-CCB5 | | 4.59 | pg of Hg | | |
| 1200873-CCV3 | 500.0 | 526.9 | pg of Hg | 105% | 77-123 |
| 1200873-CCB6 | | 5.04 | pg of Hg | | |
| 1200873-CCV4 | 500.0 | 524.7 | pg of Hg | 105% | 77-123 |
| 1200873-CCB7 | | 4.86 | pg of Hg | | |
| 1200873-CCV5 | 500.0 | 526.0 | pg of Hg | 105% | 77-123 |
| 1200873-CCB8 | | 5.71 | pg of Hg | | |
| 1200873-CCV6 | 500.0 | 522.9 | pg of Hg | 105% | 77-123 |
| 1200873-CCB9 | | 4.28 | pg of Hg | | |
| 1200873-CCV7 | 500.0 | 523.5 | pg of Hg | 105% | 77-123 |
| 1200873-CCBA | | 4.68 | pg of Hg | | |
| 1200873-CCV8 | 500.0 | 519.0 | pg of Hg | 104% | 77-123 |
| 1200873-CCBB | | 4.92 | pg of Hg | | |
| 1200873-CCV9 | 500.0 | 521.1 | pg of Hg | 104% | 77-123 |
| 1200873-CCBC | | 4.28 | pg of Hg | | |
| 1200873-CCVA | 500.0 | 517.3 | pg of Hg | 103% | 77-123 |
| 1200873-CCBD | | 4.78 | pg of Hg | | |
| 1200873-CCVB | 500.0 | 521.6 | pg of Hg | 104% | 77-123 |
| 1200873-CCBE | | 4.86 | pg of Hg | | |
| 1200873-CCVC | 500.0 | 506.0 | pg of Hg | 101% | 77-123 |
| 1200873-CCBF | | 4.04 | pg of Hg | | |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Sample Containers

**Lab ID:** 1245045-01
**Sample:** BioReactor 1 Inf
**Report Matrix:** Influent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-02
**Sample:** BioReactor 1 Inf
**Comments:** Qualify H
**Report Matrix:** Influent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-03
**Sample:** BioReactor 1 Inf Hg Blk
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-04
**Sample:** BioReactor 1 Inf Hg Blk
**Comments:** Qualify H
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-05
**Sample:** BioReactor 2 Inf
**Report Matrix:** Influent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-06
**Sample:** BioReactor 2 Inf
**Comments:** Qualify H
**Report Matrix:** Influent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Sample Containers

**Lab ID:** 1245045-07
**Sample:** BioReactor 2 Inf Hg Blk
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-08
**Sample:** BioReactor 2 Inf Hg Blk
**Comments:** Qualify H
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-09
**Sample:** BioReactor 2 Eff
**Report Matrix:** Effluent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-10
**Sample:** BioReactor 2 Eff
**Comments:** Qualify H
**Report Matrix:** Effluent
**Sample Type:** Sample
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-11
**Sample:** BioReactor 2 Eff Hg Blk
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 500 mL | 71666330 10 | none | n/a | | Cooler |

**Lab ID:** 1245045-12
**Sample:** BioReactor 2 Eff Hg Blk
**Comments:** Qualify H
**Report Matrix:** DIW
**Sample Type:** Field Blank
**Collected:** 11/05/2012
**Received:** 11/10/2012

| Des | Container | Size | Lot | Preservation | P-Lot | pH | Ship. Cont. |
|---|---|---|---|---|---|---|---|
| A | Bottle FLPE Hg-T | 250 mL | 71691270 10 | none | n/a | | Cooler |

**Project ID:** DUK-HV1201
**PM:** Tiffany Stilwater

**Client PM:** Jay Perkins
**Client PO:** 141391

# Shipping Containers

## Cooler

**Received:** November 10, 2012 10:50
**Tracking No:** 535305195608 via FedEx
**Coolant Type:** Ice
**Temperature:** 0.4 °C

**Description:** Cooler
**Damaged in transit?** No
**Returned to client?** No

**Custody seals present?** No
**Custody seals intact?** No
**COC present?** Yes

1245045

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

**Analytical Laboratory Use Only**

LIMS # J121011 0 | Matrix: OTHER | Samples Originating From | NC___ SC___
Logged By: cpb | Date & Time: 11-6-12 1008 | SAMPLE PROGRAM: Ground Water NPDES___ Drinking Water___ UST___ RCRA___ Waste___
Vendor | 4.9 Cooler Temp (C)
Vendor: ASC, Brooks Rand | MR #

| | |
|---|---|
| 1)Project Name | Belews Creek (Flex Fuel) - WW |
| 2)Phone No: | |
| 2) Client: | Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy |
| 4)Fax No: | |
| 5)Project: | MBCFFLX01 |
| 6)Account: | |
| Mail Code: | |
| 8)Oper. Unit: | BC01 |
| 9)Process: | NEXHSTK |
| 10)Activity ID: | |

*Customer to complete all appropriate non-shaded areas.*

15)Preserv.: 1=HCl, 2=$H_2SO_4$, 3=$HNO_3$, 4=Ice, 5=None

16)Analyses Required

| LAB USE ONLY 11)Lab ID | Se Speciation Bottle ID | 13)Sample Description or ID | Date | Time | Signature | 17)Comp. | 18)Grab | TDS, TSS | Hg 1631 total and filtered V_Brand | Metals + Hg 245.1* | Mn (ICP), Se (IMS) filtered | Se, Speciation, V_ASC | Chloride, Sulfate, Bromide, - Dionex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012023167 | | FGD Purge Eff | 11/5 | 09:40 | Travis Thornton | 9 | | 1 | | 1 | 1 | 1 | 1 |
| 70 | | EQ Tank | 11/5 | 08:35 | Travis Thornton | 5 | | | | 1 | 1 | | |
| 71 | | BioReactor 1 Inf | 11/5 | 08:40 | Travis Thornton | 6 | | | 1 | 1* | 1 | 1 | |
| 72 | | BioReactor 1 Inf Hg Blk | 11/5 | 08:40 | Travis Thornton | 1 | | | 1 | | | | |
| 73 | | BioReactor 2 Inf | 11/5 | 08:45 | Travis Thornton | 6 | | | 1 | 1* | 1 | 1 | |
| 74 | | BioReactor 2 Inf Hg Blk | 11/5 | 08:45 | Travis Thornton | 1 | | | 1 | | | | |
| 75 | | BioReactor 2 Eff | 11/5 | 08:50 | Travis Thornton | 6 | | | 1 | 1* | 1 | 1 | 1 |
| 76 | | BioReactor 2 Eff Hg Blk | 11/5 | 08:50 | Travis Thornton | 1 | | | 1 | | | | |
| | | | | | | | | | | | | | |
| 77 | | Filter Blank | 11/5 | 09:15 | Travis Thornton | 2 | | | | | 1 | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | 2 | 6 | 5 | 6 | 4 | 2 |

Filter Mn and Se in the field

Lab, return kit to Wayne Chapman cpb 11-6

Customer to sign & date below - fill out from left to right.

| | | | |
|---|---|---|---|
| 1) Relinquished By: Travis Thornton | Date/Time: 11/5/12 0915 | 2) Accepted By: Travis Thornton | Date/Time: 11/6/12 0915 |
| 3) Relinquished By | Date/Time | 4) Accepted By | Date/Time |
| 5)Relinquished By | Date/Time | 6)Accepted By: | Date/Time |
| 7)Relinquished By: cpb | Date/Time: 11-8-12 | 8)Accepted By: | Date/Time |
| 9)Seal/Locked By: cpb | Date/Time: 11-8-12 | 10) Seal/Lock Opened By: | Date/Time: 11/10/12 1050 |
| 11)Seal/Locked By | Date/Time | 12)Seal/Lock Opened By | Date/Time |

Customer, IMPORTANT! Please indicate desired turnaround.

22)Requested Turnaround
21 Days ____X____
*7 Days ____
48 Hr ____ 11-21-12
*Vendor Lab 13 Days ____X____

Comments: * Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

AB
11

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM


Duke Energy

Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349




**Analytical Laboratory Use Only**

LIMS # J1211010 | Matrix: OTHER | Samples Originating From | NC___ SC___

Logged By cpk | Date & Time 11-6-12 1008 | SAMPLE PROGRAM | Ground Water | NPDES ___ | Drinking Water ___ | UST ___ | RCRA ___ | Waste ___

Vendor | 4.9 Cooler Temp (C)

Vendor: ASC, Brooks Rand

[15]Preserv.: 1=HCl, 2=$H_2SO_4$, 3=$HNO_3$, 4=Ice, 5=None

MR #

Customer must Complete

| | | | |
|---|---|---|---|
| 1)Project Name | Belews Creek (Flex Fuel) - WW | 2)Phone No: | |
| 2) Client: | Melonie Martin, Wayne Chapman, Tom Johnson, Bill Kennedy | 4)Fax No: | |
| 5)Project: | MBCFFLX01 | 6)Account: | Mail Code: |
| 8)Oper. Unit: | BC01 | 9)Process: NEXHSTK | 10)Activity ID: |

**Customer to complete all appropriate non-shaded areas.**

[16]Analyses Required

LAB USE ONLY

[11]Lab ID

Customer to complete appropriate columns to right

| Se Speciation Bottle ID | [13]Sample Description or ID | Date | Time | Signature | [17]Comp. | [18]Grab | TDS, TSS | Hg 1631 total and filtered V_Brand | Metals + Hg 245.1* | Mn (ICP), Se (IMS) filtered | Se, Speciation, V_ASC | Chloride, Sulfate, Bromide, - Dionex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4 | 4 | 3 | 3 | 4 | 4 |
| 20 | 1202376970 | | | | | | | | | | | |
| | 71 | | | | | | | | | | | |
| | 72 | | | | | | | | | | | |
| | 73 | | | | | | | | | | | |
| | 74 | | | | | | | | | | | |
| | 75 | | | | | | | | | | | |
| | 76 | | | | | | | | | | | |
| | 77 | | | | | | | | | | | |
| | FGD Purge Eff | 11/5 | 09:40 | Travis Thornton | | | 1 | | 1 | 1 | 1 | 1 |
| | EQ Tank | 11/5 | 08:35 | Travis Thornton | | | | | 1 | 1 | | |
| | BioReactor 1 Inf | 11/5 | 08:40 | Travis Thornton | | | | 1 | 1* | 1 | 1 | |
| | BioReactor 1 Inf Hg Blk | 11/5 | 08:40 | Travis Thornton | | | | 1 | | | | |
| | BioReactor 2 Inf | 11/5 | 08:45 | Travis Thornton | | | | 1 | 1* | 1 | 1 | |
| | BioReactor 2 Inf Hg Blk | 11/5 | 08:45 | Travis Thornton | | | | 1 | | | | |
| | BioReactor 2 Eff | 11/5 | 08:50 | Travis Thornton | | | | 1 | 1* | 1 | 1 | 1 |
| | BioReactor 2 Eff Hg Blk | 11/5 | 08:50 | Travis Thornton | | | | 1 | | | | |
| | Filter Blank | 11/5 | 09:15 | Travis Thornton | | | | | | 1 | | |

Filter Mn and Se in the field

2 6564 2

Lab, return kit to Wayne Chapman cpk 11-6

Customer to sign & date below - fill out from left to right.

| | Date/Time | | Date/Time |
|---|---|---|---|
| 1) Relinquished By Travis Thornton | 11/5/12 0915 | 2) Accepted By | 11/6/12 0915 |
| 3) Relinquished By | | 4) Accepted By | |
| 5)Relinquished By | | 6)Accepted By: | |
| 7)Relinquished By cpk | 11-8-12 | 8)Accepted By: | |
| 9)Seal/Locked By cpk | 11-8-12 | 10) Seal/Lock Opened By | |
| 11)Seal/Locked By | | 12)Seal/Lock Opened By | |

AB 11

Comments

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, Fe, Mg, Mn * No Hg 245.1

Customer, IMPORTANT! Please indicate desired turnaround.

[22]Requested Turnaround

21 Days ____X____

*7 Days _____

*48 Hr 11-21-12

*Vendor Lab 13 Days ____X____